Request for Information (RFI) for Geostationary Earth Orbit (GEO) Hosted Payload Opportunities (HPO) and Accommodations

NASA Langley Research Center is hereby soliciting information about potential sources for Geostationary Earth Orbit (GEO) Hosted Payload Opportunities (HPO) and Accommodations.

Background

NASA's Earth Science Division (ESD) will be developing Earth Science Instruments, some of which may be suitable to fly as hosted payloads on HPO's. The development of the instruments as well as the HPO's will be conducted independently of each other with the goal of matching a specific instrument with a specific HPO by the instrument Preliminary Design Review (PDR) timeframe.

In an effort to facilitate matching instruments to HPO's, ESD initiated the Common Instrument Interface (CII) Project. The charter for the CII Project is to work with industry, academia, and other governmental agencies to develop a set of common instrument-to-spacecraft interfaces that could serve as guidelines for instrument developers. If used properly by instrument developers, these guidelines would help produce instruments that have a less complex interface and would improve the probability of matching a given instrument with a HPO or platform.

The CII Project has recently completed a draft set of Low Earth Orbit (LEO) guidelines and a draft HPO Database document. Additional information on the CII project may be found at this website: http://science.nasa.gov/about-us/smd-programs/earth-system-science-pathfinder/common-instrument-interface-workshop/. Current CII Guideline and HPO database documents may be found on the Earth Venture Instruments 1 Program Library: http://essp.larc.nasa.gov/EV-I/evi_programlibrary.html

Current Intention

The CII Project is now interested in identifying HPO's, and their associated accommodations, for future GEO missions in order to develop a draft set of GEO guidelines to complement our LEO guidelines, and to update the publically-available HPO database document. Additionally, the CII Project is investigating flying and operating a hosted payload on an upcoming GEO HPO as a pathfinder initiative (hereafter described as the "Initiative") to better understand the programmatic and technical challenges for a commercially-hosted NASA science payload. The CII Project would document lessons learned from conducting the GEO pathfinder initiative and feed them back into the GEO guidelines document to help developers intending to fly a payload on a future GEO HPO.

The purpose of this RFI is to:

1) Identify the GEO HPO's for the period from 2013-2023;
2) Obtain a description of available HPO payload accommodations on future GEO HPO's; and
3) Obtain information on all of the steps required to fly the "Initiative" as described later in this RFI.

The CII Project can accommodate responses containing properly-marked proprietary information. The CII Project will safeguard the proprietary information on hosted payload opportunities (Requested Information #1) and payload accommodations (Requested Information #2) within the Project organization. The CII Project intends to utilize the non-proprietary portions of Requested Information #1 to update the publicly available HPO database. The CII Project intends to use Requested Information #2 to bound/envelope the payload accommodation parameters that will inform the future GEO Guidelines Document. NASA may also use Requested Information #1 and #2 to assess the suitability of hosted payload-to-spacecraft matches associated with future NASA Earth Science missions.

The CII Project will use the requested information for the GEO pathfinder initiative (Requested Information #3 above) to assess the feasibility of such an Initiative, to provide an overview of the hosted payload process in the future GEO Guidelines Document, and to inform future Earth Science hosted payload planning and programming activities.

Requested Information

1. Please identify your organization's HPO's for the period of 2013-2023 with their associated mission parameters including but not limited to:

- Mission Name
- Launch Date
- Owner/Operator
- Primary Customer
- Spacecraft Bus Manufacturer
- Spacecraft Bus Model
- Launch Vehicle
- Orbital Longitude

If the data are not available beyond your current business cycle, please suggest a technique for the CII Project to obtain those data once they do become available.

2. Please describe what Payload Accommodation and Interface resources your HPO's can provide to a prospective hosted payload without significant modifications to your nominal manufacturing, integration, test and launch processes. Please also describe the environment the prospective hosted payload might expect to encounter:

- Payload Accommodation Parameters and Interface
    - Maximum Payload Mass Available without System Redesign [kg]
    - Maximum Payload Orbital Average Power without System Redesign [W]
    - Maximum Payload Peak Power without System Redesign[W]
    - Main Bus Nominal Voltage [V]
    - Volume (l x w x h) [mm x mm x mm]
    - Sensor Mounting Location on Spacecraft (e.g. Nadir, Zenith, Ram, Wake, North, South, East, West, …)
    - Command and Control Interface (1553B, RS-422, SpaceWire, etc.) with average and peak data rates [kbps]

- Payload-to-Transponder Interface (RS-422, SpaceWire, etc.) for Science Data Transmission with average and peak data rates [Mbps]
- Host spacecraft constraints or preferences for digital formats most suitable for conversion to RF in system architecture
- Payload command and control encryption requirements
- Pointing Control [arcsec]
- Pointing Knowledge [arcsec]
- Pointing Stability [arcsec / sec]
- Spacecraft absolute position accuracy, each axis [m]
- Spacecraft absolute velocity accuracy, each axis [m/s]
- Limitations with respect to payload-induced uncompensated torques [N x m] by frequency [Hz]
- Limitations with respect to payload-induced uncompensated forces [N] by frequency [Hz]
- Typical Integration and Test Facility Cleanliness [Cleanroom Class]
- Thermal Rejection With Heat Pipes [W]
- Thermal Rejection Without Heat Pipes [W]

- Payload Environment
  - Temperature Range
  - Quasi-static loads
  - Minimum resonant frequency
  - Random vibration and acoustic loads
  - Shock environment
  - Disturbance torque
  - RF Field EMI/EMC/ESD
  - Molecular contamination as a function of mission elapsed time and hosted payload location

3. As a specific potential near term opportunity, please provide information on all of the programmatic and technical steps required to fly a GEO Pathfinder Initiative on your HPO's as described below.

GEO Pathfinder Initiative Information

The Initiative will also provide NASA with experience with the commercially-hosted payload process. The Initiative will also mitigate space environmental risks to future GEO missions by measuring vibration and contamination of an Instrument Suite hosted on a commercial GEO spacecraft. Both objectives will reduce risk on future commercially-hosted GEO Earth Science missions. See attached Figure 1 for an example of a notional Instrument Suite, which the CII Project will develop and provide, with the following characteristics:

- Mass: 50 kg
- Power: 125 W
- Volume: 1000 x 500 x 500 mm
- Data Rate: 60 Mbps

- Thermal Control: Electronics thermally isolated, with exterior boxes insulated with multi-layer insulation (MLI).
- The Instrument Suite is presumed to be mounted on the host spacecraft nadir deck.
- The Instrument Suite has a nominal operational lifetime of 3 years

Note: The Initiative is designed to exercise the GEO hosted payload process whose parameters are a subset and likely smaller than those of a typical future science flight mission.

GEO Pathfinder Initiative Requested Information

Please provide information related to the accommodation of the Instrument Suite by your mission:

- Date the contract needs to be signed relative to Launch Date
- Government-provided technical / programmatic deliverables required (e.g. mass and thermal models)
- Instrument Suite delivery date required relative to Launch Date
- Rough Order of Magnitude Price Estimate to fly and operate the Initiative. In addition to the Total price, please estimate the following components:
    - Integration, Test, and Launch
    - Operations
- Any concerns with FAR Part 12 terms and conditions: https://acquisition.gov/far/html/FARTOCP12.html
- Concept of operating hosted payload, including communications architecture
- Safety and mission assurance requirements levied upon hosted payload
- The level of NASA participation allowed during spacecraft development and instrument integration (e.g. spacecraft design reviews, environmental tests, etc.)

NASA is seeking capability statements from all interested parties, including Small, Small Disadvantaged (SDB), 8(a), Woman-owned (WOSB), Veteran Owned (VOSB), Service Disabled Veteran Owned (SD-VOSB), Historically Underutilized Business Zone (HUBZone) businesses, and Historically Black Colleges and Universities (HBCU)/Minority Institutions (MI) for the purposes of determining the appropriate level of competition and/or small business subcontracting goals.

No solicitation exists; therefore, do not request a copy of the solicitation. If a solicitation is released it will be synopsized in FedBizOpps and on the NASA Acquisition Internet Service. It is the potential offeror's responsibility to monitor these sites for the release of any solicitation or synopsis.

Vendors having the capabilities necessary to meet or exceed the stated requirements are invited to submit appropriate documentation, literature, brochures, and references.

Please advise if the requirement is considered to be a commercial or commercial-type product. A commercial item is defined in FAR 2.101.

This synopsis is for information and planning purposes and is not to be construed as a commitment by the CII Project nor will the CII Project cover any costs for information submitted in response to the RFI.

Technical questions should be directed to Craig Jones at Craig.D.Jones@nasa.gov. All other questions should be directed to Brad Gardner at Robert.B.Gardner@nasa.gov. All responses shall be submitted to Brad Gardner at Robert.B.Gardner@nasa.gov and to Craig Jones at Craig.D.Jones@nasa.gov no later than May 11, 2012. Respondents may e-mail files up to 10MB in size to Brad Gardner; respondents shall submit larger files on optical storage media (CD/DVD) via postal mail to the following address:

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Please reference CII-GEO in any response.